Presented to [redacted] 23 April 1964

ILLEGIB

# Research and Development Project Approval Request

## I. Identification

The Development Branch of the Plans and Development Staff proposes the development of two sets of prototype Variable-Ratio, Anamorphic Eyepieces, one from [redacted] and the other from the [redacted] This project was not included in the budget for Fiscal 1964; however, this development is a fast-reaction response to an anamorphic distortion problem presented by unusual distortion characteristics of operational materials from recent acquisition systems. Technical analysis of potential solutions leaves little doubt that we must undertake this development in Fiscal 1964. 25X1A

## II. Objectives

The objective is to develop an external modification for the standard micro-stereoscopes which will produce a variable-ratio anamorphic transformation in the image. The simplest and most straightforward method appears to be the installation of variable-ratio anamorphic eyepieces to [redacted] Bausch and Lomb Zoom 70 microstereoscopes. This approach allows the stereoscope to be used normally except when anamorphic compensation is required, and then the proposed attachment can be added quickly and easily by an interpreter. 1A

## III. Background

The viewing of oblique stereo pairs has always required a high degree of accommodation by the human visual system. Whereas this has been fatiguing in the past, it has not presented an intolerable problem. Recently, however, certain oblique reconnaissance photos have exhibited distortions which caused excessive eyestrain in stereo-viewing and in some cases the images could not be fused. It appears that there will be a continuing requirement for viewing this type of photography.

This project was undertaken on an emergency basis to provide an operational solution to the new problem within the shortest possible time. Delivery of the prototypes would be within 3-4 months of the award of contract. Because this development involves a totally new approach -- pushing the "state-of-the-art," and because of the unusually short delivery

time and the relatively low cost, it appeared prudent to undertake a parallel development with two highly qualified contractors as backup insurance toward obtaining a successful device within a reasonable time span. Both [redacted] have had extensive experience with anamorphic systems. In addition [redacted] had a patent on an exceptionally simple variable-ratio, anamorphic device; however [redacted] claimed that [redacted] Laboratory was currently overloaded with priority projects, and he declined to bid. 25X1A 25X1A 25X1A 25X1A

The decision was made to incorporate the anamorphic correction mechanisms into the Zoom 70 eyepieces in order to introduce the accessory to the largest number of viewing instruments, in the least amount of time and with the smallest amount of actual modification to existing equipment.

IV. Technical Specifications

A. [redacted] Proposal. 25X1A

1. [redacted] investigated two separate approaches toward the development of a variable power anamorphic system. One approach utilizes cylindrical lenses (cylindrical lenses magnify in one axis only). The other incorporates rotatable prisms working in collimated light and utilizing the minimum deviation phenomena. One of these approaches will be selected by NPIC early in the program.

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2. [redacted] will provide:

a. During the study phase, either a 5X eyepiece, variable in one axis from 5X to 15X; or a 10X lens, variable in one axis from 10X to 30X. One of these will be selected by NPIC at the end of the study phase.

b. A maximum loss of field of 15%.

c. Anamorphic direction adjustment through 360°.

d. Resolution loss not to exceed 20% of the standard eyepieces.

e. Eyepiece length not to exceed 6 inches.

f. Parallel mounting of eyepieces by the introduction of a small optical wedge.

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B. [redacted] Proposal.

2.

1. [redacted] proposes a variable-power (Zoom-type) system incorporating cylindrical lenses. Two tentative designs were suggested by the vendor. NPIC elected to pursue the second design concept because it is much simpler and considerably more compact. 25X1A

2. [redacted] design will provide: 25X1A

a. A set of anamorphic adapter elements with four sets of inter-changeable 10X, 15X, 20X and 30X eyepieces.

b. 360° rotation of the axis of anamorphic distortion.

c. The following operational magnification ranges:

| Eyepiece | Mag X | Mag Y |
|---|---|---|
| 10X | 5X | 5X- 15X |
| 20X | 10X | 10X- 15X |
| 15X | 7.5X | 7.5X- 22.5X |
| 30X | 15X | 15X- 45X |

V. Contractor and Financial Arrangements

This development would be accomplished under two separate contracts:

1. A [redacted] fixed-price contract with [redacted] for the development and fabrication of a set of prototype 5X or 10X variable-ratio, anamorphic eyepieces. 25X1A 25X1A 25X1A

2. An approximately [redacted] CPFF contract with [redacted] for the development and fabrication of a set of anamorphic elements which will accept four separate eyepieces of different powers. 25X1A 25X1A

Both contracts would provide delivery of prototype units within approximately 3-4 months of the actual award of contract.

VI. Coordination

This project has been coordinated with PID and discussed with various PAG analysts. By virtue of contacts throughout industry and the intelligence community, it is concluded that no such devices are currently in existence.

VII. Security

[redacted] 5X1A